CLAIMS

1. An electronic system comprising,:

a plurality of heat dissipating components, each component having an independently controllable cooling fan operatively connected thereto; and

a fan manager communicating with each component to determine an operating parameter of each component and generating control signals to independently control each cooling fan based on the determined operating parameter for each component.

2. The system of claim 1, wherein at least one cooling fan is controlled to have a different speed than at least one other cooling fan.

3. The system of claim 1, wherein the fan manager includes a plurality of distributed fan manager elements local to each heat dissipating component and configured to determine an operating parameter that is specific to the respective component.

4. The system of claim 3, wherein the heat dissipating components are processors and the operating parameter determined includes at least one selected from the group consisting of the identification of an operating instruction to be processed in the future by the processor and whether an instruction to be processed by the processor is a high power consuming instruction.

5. The system of claim 4, wherein determining the operating parameter includes at least one selected from the group consisting of monitoring a system bus to determine instructions to be processed and communicating with a branch prediction unit of a processor.

6. The system of claim 3, wherein the fan manager further includes a centralized fan management element in communication with the distributed fan manager elements.

7. The system of claim 1, wherein the heat dissipating components are provided on one or more cards within the electronic system and the fan manager is divided among at least two of (a) heat dissipating component level fan managers, (b) a card level fan manager, and (c) a system level fan manager.

8. The system of claim 1, wherein the electronic system includes a plurality of electronic modules and at least one module controller.

9. The system of claim 8, wherein the electronic modules each include module control circuits that communicate with the module controller and the fan manager is implemented in at least one of the module control circuits and the module controller.

10. The system of claim 9, wherein the electronic system is a blade system, the electronic modules are blades, the module control circuits are blade control circuits, and the module controller is a blade controller.

11. The system of claim 10, wherein a plurality of the heat dissipating components are located on one blade.

12. The system of claim 9, wherein at least one electronic module is a rack mounted server and a plurality of the heat dissipating components are processors located on the rack mounted server.

13. The system of claim 1, wherein the operating parameters determined by the fan manager include the operational frequency of a heat dissipating component.

14. The system of claim 1, wherein the operating parameters determined by the fan manager include the operating voltage of a heat dissipating component.

15. The system of claim 1, wherein the operating parameters determined by the fan manager include the power consumed by a heat dissipating component.

16. A method of cooling heat dissipating components in an electronic system having a plurality of heat dissipating components, a cooling fan operatively connected to each heat dissipating component, and a fan manager, comprising:

determining by the fan manager an operating parameter of each heat dissipating component; and

generating by the fan manager of control signals to independently control each cooling fan based on the operating parameter of the heat dissipating component that is operatively connected to that fan.

17. The method of claim 16, wherein at least one cooling fan is controlled to have a different speed than at least one other cooling fan.

18. The method of claim 16, wherein the fan manager includes a plurality of distributed fan manager elements local to each heat dissipating component and configured to determine an operating parameter that is specific to the respective component.

19. The method of claim 18, wherein the heat dissipating components are processors and the operating parameter determined includes at least one selected from the group consisting of the identification of an operating instruction to be processed in the future by the processor and whether an instruction to be processed by the processor is a high power consuming instruction.

20. The method of claim 19, wherein determining the operating parameter includes at least one selected from the group consisting of monitoring a system bus to determine instructions to be processed and communicating with a branch prediction unit of a processor.

21. The method of claim 18, wherein the fan manager further includes a centralized fan management element in communication with the distributed fan manager elements.

22. The method of claim 16, wherein the heat dissipating components are provided on one or more cards within the electronic system and the fan manager is divided among at least two of (a) heat dissipating component level fan managers, (b) a card level fan manager, and (c) a system level fan manager.

23. The method of claim 16, wherein the electronic system includes a plurality of electronic modules and at least one module controller.

24. The method of claim 23, wherein the electronic modules each include module control circuits that communicate with the module controller and the fan manager is implemented in at least one of the module control circuits and the module controller.

25. The method of claim 24, wherein the electronic system is a blade system, the electronic modules are blades, the module control circuits are blade control circuits, and the module controller is a blade controller.

26. The method of claim 25, wherein a plurality of the heat dissipating components are located on one blade.

27. The method of claim 23, wherein at least one electronic module is a rack mounted server and a plurality of the heat dissipating components are processors located on the rack mounted server.

28. The method of claim 16, wherein the operating parameters determined by the fan manager include the operational frequency of a heat dissipating component.

29. The method of claim 16, wherein the operating parameters determined by the fan manager include the operating voltage of a heat dissipating component.

30. The method of claim 16, wherein the operating parameters determined by the fan

manager include the power consumed by a heat dissipating component.

31. A fan manager for cooling heat dissipating components in an electronic system having a plurality of heat dissipating components and a cooling fan operatively connected to each heat dissipating component, comprising:

a determinator communicating with each heat dissipating component to determine an operating parameter of each heat dissipating component;

a controller generating control signals to independently control each cooling fan based on the determined operating parameter of the component operatively connected to that fan.

32. A fan system for cooling a heat dissipating component within an electronic system, comprising:

a fan controllable to a desired operating speed and operatively connected to the heat dissipating component; and

a fan manager determining an operating parameter indicative of the heat dissipated by the heat dissipating component, calculating a control signal indicative of the desired speed of the fan based upon the value of the operating parameter, and communicating the control signal to the fan to control its speed.

33. The system of claim 32, wherein the fan manager includes a distributed fan manager element local to the heat dissipating component and configured to determine an operating parameter that is specific to the respective component.

34. The system of claim 33, wherein the heat dissipating component is a processor and the operating parameter determined includes at least one selected from the group consisting of the identification of an operating instruction to be processed in the future by the processor and whether an instruction to be processed by the processor is a high power consuming instruction.

35. The system of claim 34, wherein determining the operating parameter includes at

least one selected from the group consisting of monitoring a system bus to determine instructions to be processed and communicating with a branch prediction unit of a processor.

36. The system of claim 35, wherein the fan manager further includes a centralized fan management element in communication with the distributed fan manager element.

37. The system of claim 34, wherein the heat dissipating component is provided on one or more cards within the electronic system and the fan manager is divided among at least two of (a) heat dissipating component level fan managers, (b) a card level fan manager, and (c) a system level fan manager.